

Demand-Limiting Assessment Tool for Small Commercial Buildings

July 9, 2007

Jim Braun – Purdue University

Outline

- **Tool Objectives**
- **Demonstration**
- **Next Steps**

Small Building Assessment Tool

Current Objectives

- Quick assessment tool for potential end users to evaluate
 - demand reduction
 - operating cost savings
 - occupant thermal comfort impacts
- Only allow users to change most important factors
 - Type and size of building
 - Location
 - Utility rates
 - Occupancy schedule
 - Demand-limiting parameters
 - Equipment efficiency
- Potentially useful as a tool for utilities to promote this technology

Demo

Small Building Assessment Tool

Demand-Limiting Assessment Tool

File Edit Help

General **Site** **Occupancy** **Setpoints** **Costs** **Savings** **Peak Day Power** **Temperatures** **Comfort**

Building

Type: Small Office Building

Area: 6600 square feet

☐ US ☐ Canada

☒ CA Climate Zones

Climate Zone 01
Climate Zone 02
Climate Zone 03

Equipment

Type: ☒ F ☐ H

Efficiency: ☐ Low


Closed Damper Leakage

Base Case

☒ Setback Thermostat ☒ Unoccupied Fan Cycling

☐ Use Default Site

About

 **Demand-Limiting Assessment Tool**
Release Version 05/2007, Copyright 2007,
Herrick Laboratories, Purdue University.

Note: This tool provides "quick" estimates of peak demand reduction along with cost and comfort impacts associated with a demand-limiting strategy that utilizes adjustment of building zone temperature setpoints within comfort bounds. The results are meant to be representative for a set of predefined prototypical buildings and equipment.

Small Building Assessment Tool

Next Steps

- Incorporate wider range of building prototypes and systems
- Web-based implementation
- End-user feedback
- Electronic reference manual

Small Building Assessment Tool

Demo

Demand-Limiting Assessment Tool

File Edit Help

General Site Occupancy Setpoints Costs Savings Peak Day Power Temperatures Comfort

Building

Type

Area

Equipment

Type ☒ Rooftop AC + Gas Heat ☐ Heatpump + Electric Heat

Efficiency ☐ Low ☒ Medium ☐ High

Closed Damper Leakage

Base Case

☒ Setback Thermostat ☒ Unoccupied Fan Cycling

☐ US ☐ Canada

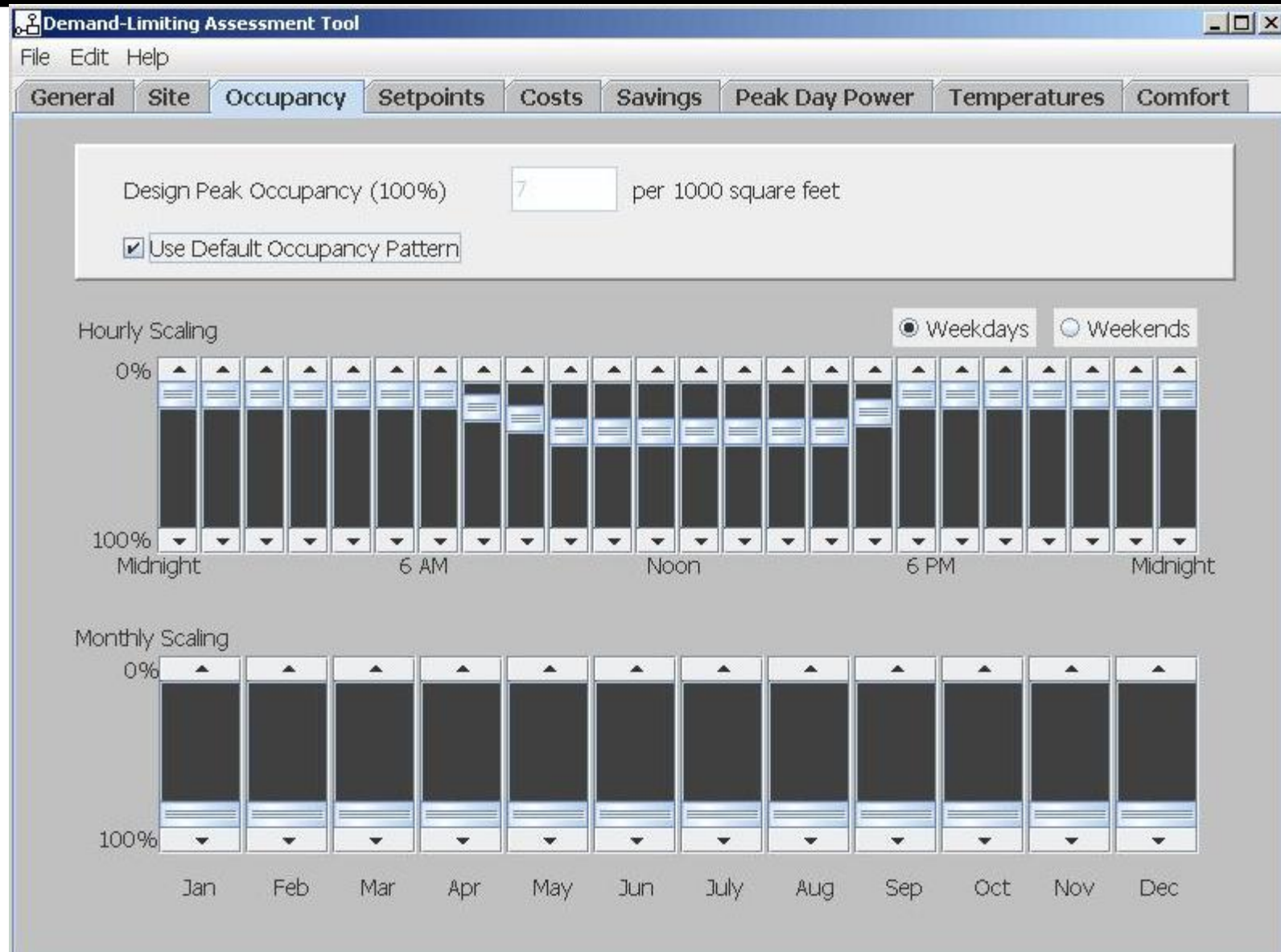
☒ CA Climate Zones

Climate Zone 01
Climate Zone 02
Climate Zone 03
Climate Zone 04
Climate Zone 05
Climate Zone 06
Climate Zone 07
Climate Zone 08
Climate Zone 09
Climate Zone 10
Climate Zone 11
Climate Zone 12
Climate Zone 13
Climate Zone 14
Climate Zone 15

☐ Use Default Site

Small Building Assessment Tool

Demo



Small Building Assessment Tool

Demo

Demand-Limiting Assessment Tool

File Edit Help

General Site Occupancy **Setpoints** Costs Savings Peak Day Power Temperatures Comfort

Normal Day Setpoints

Occupied Setpoint Cooling 74.0 F

Unoccupied Setpoint Cooling 85.0 F

Demand-Limiting Day Setpoints

Precooling Setpoint 70.0 F

Maximum Occupied Setpoint Cooling 78.0 F

Number of Days for Demand-Limiting Control

Demand-Limiting Time

Start Time for Precooling 6:00 AM

Start Time for Demand-Limiting 12:00 PM

Stop Time for Demand-Limiting 6:00 PM

☐ Use Default Setpoints

Demo

Small Building Assessment Tool

Demand-Limiting Assessment Tool

File Edit Help

General Site Occupancy Setpoints **Costs** Savings Peak Day Power Temperatures Comfort

Electric Utility Rates Program **User Defined**

Normal Electric Utility Rates

Season ☒ Summer ☐ Winter

Start Date May 1

	On Peak	Off Peak
Start	12:00 PM	10:00 PM
Stop	6:00 PM	9:00 AM

Without CPP Program

	On Peak	Mid Peak	Off Peak	
Energy	0.140	0.105	0.075	\$/kWh
Demand	15.00	3.60	0.00	\$/kW

With CPP Program

	On Peak	Mid Peak	Off Peak	
Energy	0.110	0.095	0.075	\$/kWh
Demand	15.00	3.60	0.00	\$/kW

CPP Event Electric Energy Changes

CPP Rates? **Yes**

Number of Days for CPP Rates 10

	Summer Super Peak	Winter Super Peak
Start	12:00 PM	12:00 PM
Stop	6:00 PM	6:00 PM
Rate	0.560 \$/kWh	0.105 \$/kWh

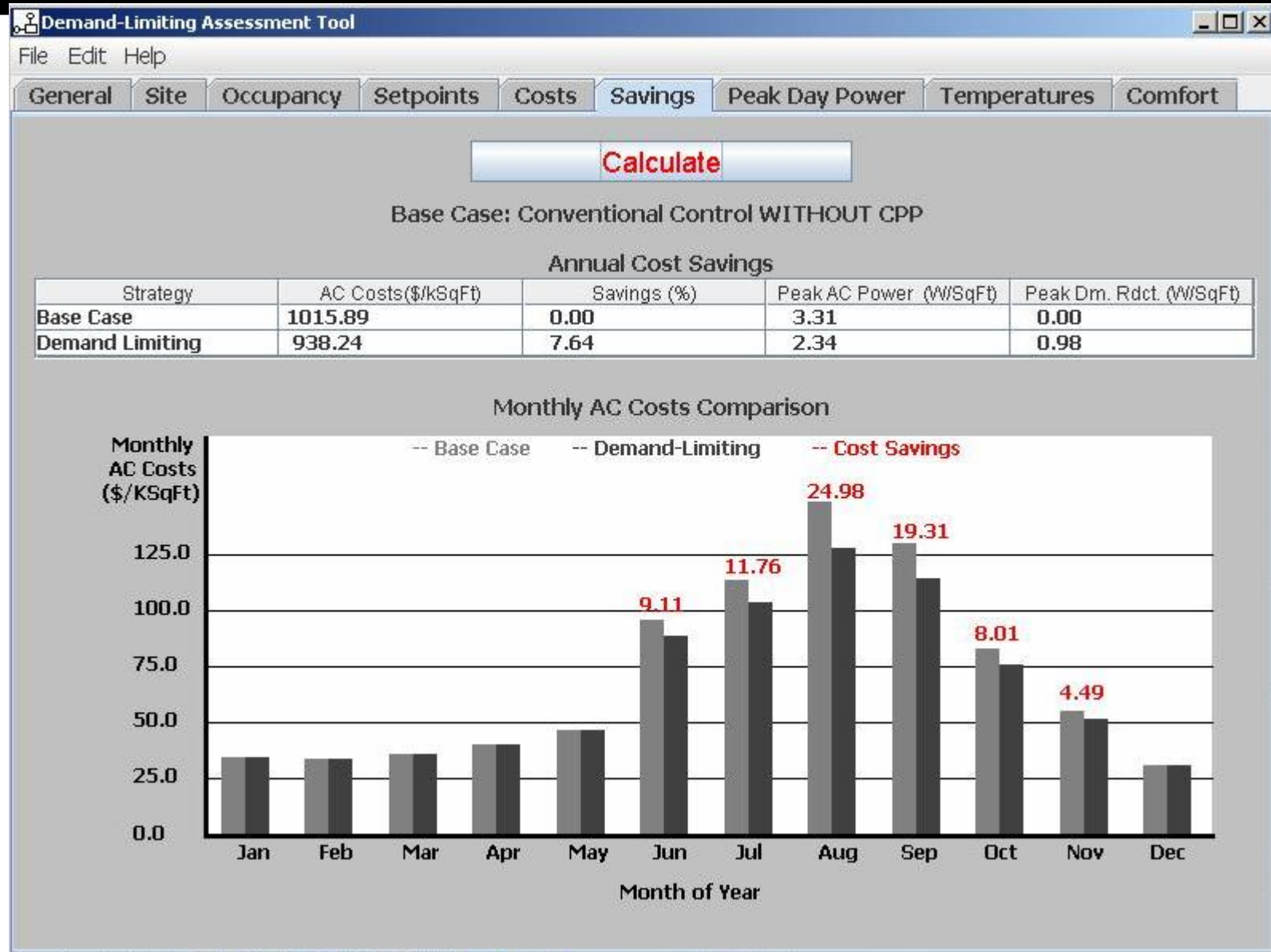
Base Case Selection

☒ Conventional Control WITHOUT CPP

☐ Conventional Control WITH CPP

Small Building Assessment Tool

Demo



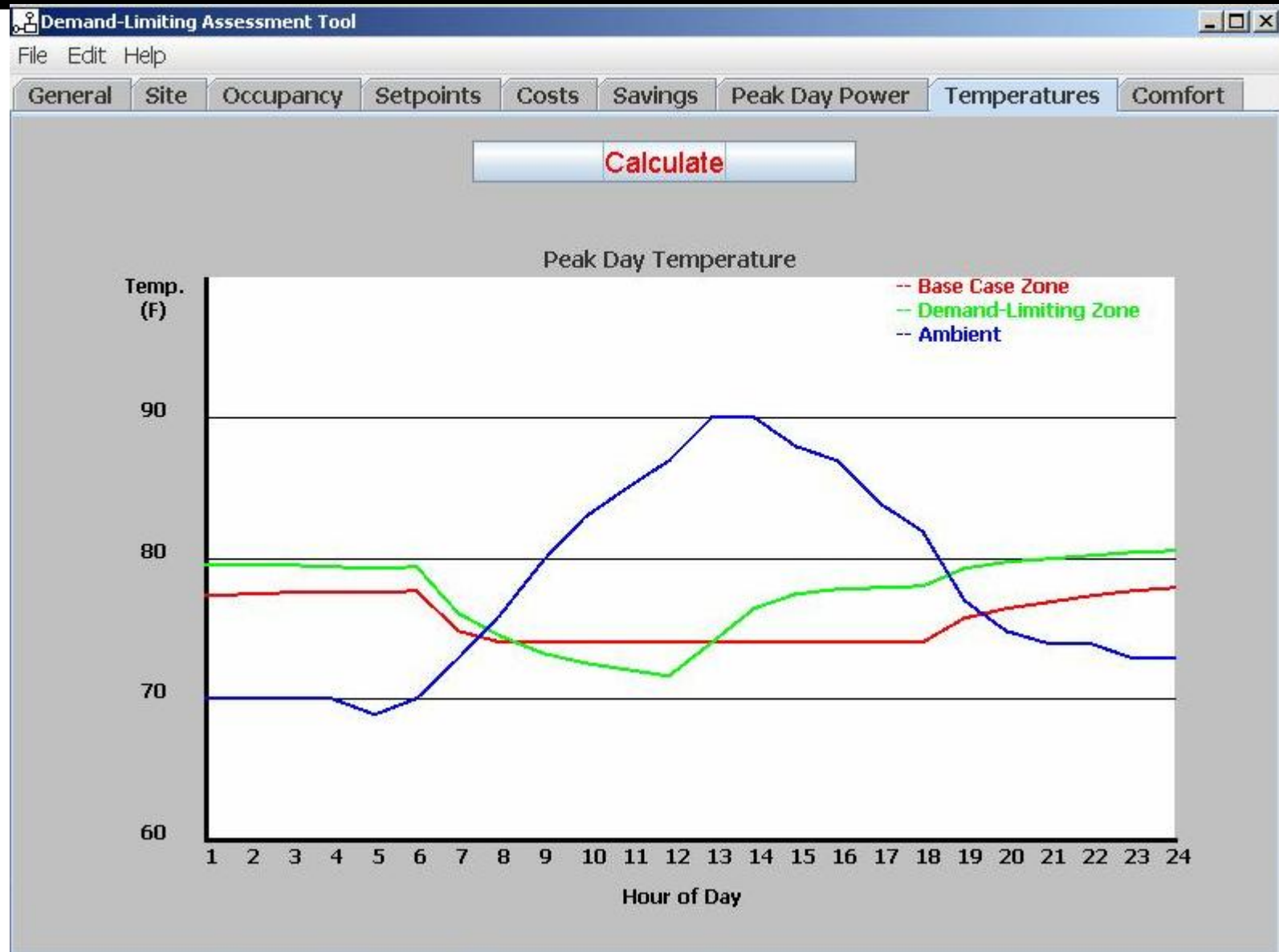
Small Building Assessment Tool

Demo



Demo

Small Building Assessment Tool



Demo

Small Building Assessment Tool

